## Acknowledgement

Thank you for purchasing this transceiver. We have been dedicated to providing novel and fine radio products. This transceiver is no exception. We are confident that this product will satisfy your requirements for both voice and data communication.

## PRECAUTIONS

Please observe the following precautions to prevent fire, personal injury and/or device damage:

- Do not attempt to configure the transceiver while driving; it is extremely dangerous.
- Do not transmit with high output for extended periods. Otherwise, the transceiver may become overheated and its service life may be shortened.
- Do not dismantle or retrofit the transceiver for any reason, unless otherwise specified in this manual or other manuals of this company.
- Do not expose the transceiver to blazing sun for a long time.
- Do not put it in a place close to heating appliances.
- Do not place the transceiver in excessively dusty, humid or wet areas, or on unstable surfaces.
- If any abnormal odor or smoke is detected coming from the transceiver, immediately turn off the power and contact the local distributer.
- Using a transceiver in driving may violate traffic laws. Please inquire or consult the local transportation administration body about the details and observe the local traffic laws.
- Do not use options not designated by this company.

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## Preparation

### Standard Configuration Accessories

| Accessory | Quantity |
|---|---|
| Handheld MIC | 1 |
| Mounting bracket | 1 |
| DC power cable | 1 |
| Holder for handheld MIC | 1 |
| Screw set | 1 |

### Installation of Transceiver

Select a safe and convenient site in your vehicle so as to reduce possible damage to your passenger or yourself during vehicle movement. You may install the transceiver blow the dashboard in front of the front passenger seats so that your knees and legs will not collide the transceiver in case of emergency brake. It's best to select a well ventilated location which is shielded from direct sunlight.

1. Use the supplied self-tapping screws (4X) and flat washers (4X) to install the mounting bracket in the vehicle as shown in Fig. 1 and Fig. 2.

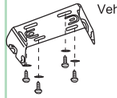


Fig. 1

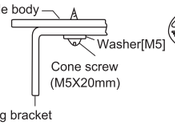



Fig.2

Fig. 3

2. Fix the transceiver, and then insert and tighten the supplied hexagonal screws (4X) as shown in Fig. 3.

Make sure all screws are tightened to avoid loosening of the bracket or the transceiver in vibration of vehicle.

Use the 3 screw grooves at the side rear side of each bracket to install the main body at a proper inclined angle as shown in Fig., 4, 5 and 6.

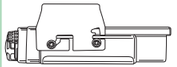


Fig. 4

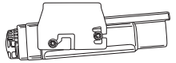


Fig. 5

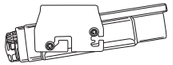


Fig. 6

### Power Cable Connection

■ Operation of transceiver

Be sure to use 12V vehicle batteries with sufficient electricity. If the electricity is insufficient, the display screen may darken or the transmission output power may greatly drop during the transmission. Do not connect the transceiver to 24V batteries.

**Note:** If you use the transceiver when the vehicle-use batteries are not sufficiently charged or the engine is off, battery discharge may lead to insufficient electricity quantity, making it difficult to start the vehicle. Therefore, try to avoid using the transceiver in such situation.

1. Use the DC power cable supplied with the transceiver to connect the transceiver with the vehicle battery terminal in a shortest route.

● It is suggested not to use a cigar lighter outlet as much as possible as some of them may lead to great voltage drop.

● The whole power cable must be wrapped up to isolate it from heat and moisture and from the engine ignition system/connection wiring.



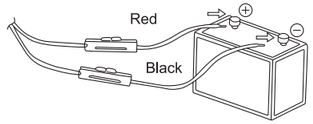


2. When the power cable is installed in place, wind the fuse holder with heat-resistant adhesive tape to protect it against moisture. Itís better to use heat-resistant adhesive tape to wrap the whole power cable.

3. To prevent short-circuit, disconnect the other connection wirings at the negative (-) battery terminal before connecting the transceiver.

4. Please confirm the correct polarity of connections before attaching the power cable to the battery terminal. Connect the red wire to the positive (+) terminal of battery and the black to the negative (-).

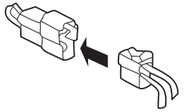
● Use the full length of power cable without cutting off the excess even if it is longer than needed. Remember not to remove the fuse holder from the cable.




5. Reconnect all connection wirings removed from the negative terminal previously.

6. Connect the DC power cable to the transceiver.

● Plug in the outlet and keep pushing firmly until the locking tab clicks.



■ Operation of fixed radio station

If you intend to use the transceiver as a fixed radio station, you need to buy an independent 13.8 DC power supply separately with a suggested continuous current capacity of above 12A.

**Note:**

● Do not connect this DC power supply to the AC power outlet before all connections are completed. (Do not connect the transceiver when it's powered on.)

● Please connect all cables before inserting the DC power supply device into the AC outlet.

1. Be sure the transceiver and the DC power supply are off.

2. Connect the DC power supply cable to the DC stabilized power supply and make sure the polarities are correct (red: positive, black: negative).

● Do not directly connect the transceiver to the AC outlet.

● Use the supplied DC power cable to connect the transceiver to a DC stabilized power supply.

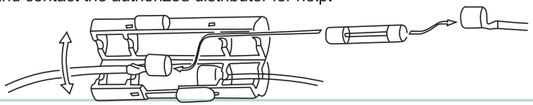
● Do not use a power cable with the specification and parameters lower than the original power cable.

3. Connect the DC power cable to the transceiver.

● Plug in the outlet and keep pushing firmly until the locking tab clicks.

■ Fuse replacement

If the fuse is blown, please find out the cause and fix it. After that, replace the fuse. If the new fuse continues to blow, disconnect the power cable and contact the authorized distributor for help.



| Location of fuse | Rated current of fuse |
|---|---|
| transceiver | 15A |
| Supplied DC power cable | 20A |

**Attention**

Only use fuses of specified type and rated value. Otherwise, the transceiver may be damaged at your own risk.

### Connecting Antennas

Before operation, install a highly efficient and well-tuned antenna. Successful installation depends largely on the correct antenna type and installation. If a proper antenna system is selected and installed correctly, the transceiver will achieve best performance.

Use an antenna with a characteristic impedance of 50 and a low loss coaxial feeder with 50 characteristic impedance to match the input impedance of the transceiver. Using a feeder whose impedance is not 50 to connect the antenna with the transceiver will reduce the performance of the antenna system, and may cause interference to the nearby radio and TV receivers, radio receivers and other electronic devices and even damage the transceiver.

**Attention**

◆ Transmitting without connecting antenna or other matched load is prohibited. Otherwise, the transceiver will be damaged. Be sure to connect the antenna to the transceiver before transmitting, and only when the connection is confirmed can the transmission be made.

◆ All fixed radio stations must be equipped with a lightning arrester to reduce the risk of damaging the transceiver by fire or electric shock.

The location and mounting mode of the antenna on the vehicle are shown as follows:

### Removal and Installation of Front Panel

In the light of the location/mode of the installation of transceiver, you may remove the front panel and install it to a proper site with the extension line.

1. At the left side of the front panel, push the release latch of the front panel directly in the left rear direction as shown in Fig. 8.

Fig. 8

2. Slide the front panel in parallel to left and pull it out forward and away from the main body of the transceiver as shown in Fig. 9.

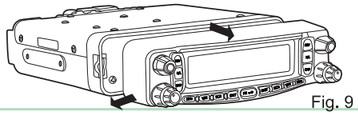


Fig. 9





3. Move the front panel in parallel from left to right till the front panel fits the body and a "click" is heard. Thus, the front panel is installed.

### Connecting Accessories

Handheld MIC

For voice communication, connect the supplied handheld MIC to the MIC outlet on the right side of the transceiver. Please align the RJ12 plastic spring piece upward with the MIC outlet till the locking tab is locked in place with a sound of "click", as shown in Fig. 10.

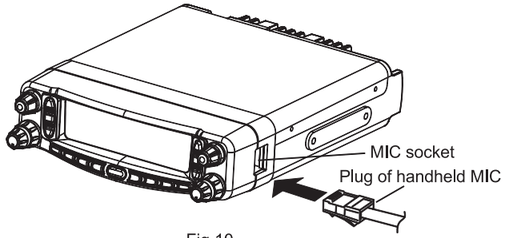
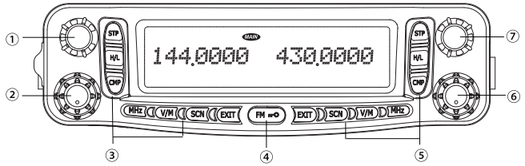



Fig.10

## Get Familiar with the Transceiver

### Front Panel




① Left tuning knob (DIAL)

Rotate this knob to select the left band operation frequency or memory channel, change the scanning direction and select function menu and parameters.

Press this knob shortly to switch the left band as the main band.

When the left band is set as the main band, press this knob shortly to enter the first level and second level of the setting status of function menu. In the function menu setting status, press this knob shortly to confirm the setting.

② Left volume/squelch knob (VOL SQL)

The center VOL (volume) control knob is used to adjust the speaker volume of the left band when receiving. Turn it clockwise to increase the volume.The outer SQL (squelch) control knob is used to eliminate the background noise of the left band when receiving. Turn it clockwise to the extent that the noise disappears (the BUSK on the screen disappears) so as to improve the sensitivity of weak signal.

③ Left keys

[REV] Frequency reverse selection

Shortly press [REV]. If the left band starts the frequency reverse function, the transmission-receiving frequency will reverse.

[H/L] Power adjustment

Shortly press [H/L], and the left band transmission power can be switched between high power (High) and low power (Low).

[CMP] Start companding

Shortly press [CMP] to open the left band companding function.

[MHz] MHz adjustment

Shortly press [MHz] and the Mb will flicker. Turn DIAL to adjust the Mb frequency and press DIAL shortly to confirm.

[V/M] Switch between VFO frequency mode and memory channel mode

Shortly press this key to switch the left band frequency control mode between VFO frequency mode and memory channel mode.

[SCN] Scanning

Shortly press this key to activate the scanning of left band.

[EXIT] Return/exit

④ [FM/ ] Start radio receiver/keypad lock

Shortly press this key to enter/exit the FM receiver mode.

Press this key for long to start the keypad lock.

⑤ Right side keys

[EXIT] Return/exit

[SCN] Scanning

Shortly press this key to activate the scanning of right band.

[V/M] Switch between VFO frequency mode and memory channel mode

Shortly press this key to switch the right band frequency control mode between VFO frequency mode and memory channel mode.

[MHz] MHz adjustment

Shortly press [MHz] and the Mb will flicker. Turn DIAL to adjust the Mb frequency and press DIAL shortly to confirm.

[CMP] Start companding

Shortly press [CMP] to open the right band companding function.

[H/L] Power adjustment

Shortly press [H/L] and the right band transmission power can be switched between high power (High) and low power (Low).

[REV] Frequency reverse selection

Shortly press [REV]. If the right band starts the frequency reverse function, the transmission-receiving frequency will reverse.

⑥ Right volume/squelch knob (VOL SQL)

The center VOL (volume) control knob is used to adjust the speaker volume of the right band when receiving. Turn it clockwise to increase the volume.

Press the knob for 2 seconds to power on/off.

The outer SQL (squelch) control knob is used to eliminate the background noise of the right band when receiving. Turn it clockwise to the extent that the noise disappears (the BUSK on the screen disappears) so as to improve the sensitivity of weak signal.

⑦ Right tuning knob (DIAL)

Rotate this knob to select the right band operation frequency or memory channel, change the scanning direction and select function menu and parameters.

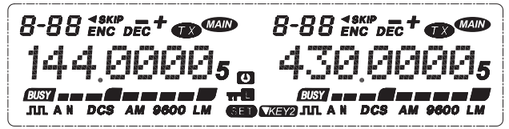
Press this knob shortly to switch the right band as the main band.

When the right band is set as the main band, press this knob shortly will enter the first level and second level of the setting status of function menu.

In the function menu setting status, press this knob shortly to confirm the setting.

**Display Screen**

<Left Frequency Band> <Right Frequency Band>

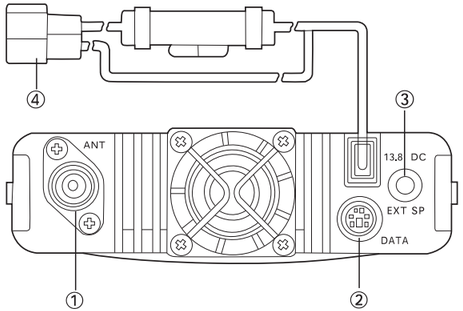



| Icon | Description |
|---|---|
| 8-88 | Displays the number of memory channel and context menu. |
| ◀ | Appears when the frequency reverse function is activated. |
| SKIP | No definition for this device |
| — | Appears when the transmission difference frequency offset is set as negative. |
| + | Appears when the transmission difference frequency offset is set as positive. |

| Icon | Description |
|---|---|
| ENC | Appears when transmission of CTCSS (Continuous Tone Coded Squelch System) is activated in transmission status. |
| DEC | Appears when receiving of CTCSS (Continuous Tone Coded Squelch System) is activated. |
| TX | Indicates the transceiver is in transmission status. |
| MAIN | Indicates the current frequency band is the main one. |
| 144.0000 5 | Displays the operation frequency, name of memory channel and context menu. |
| BUSY | Appears in busy signal receiving. |
| | Displays the signal strength when receiving and displays the power level selected in transmission. |
| | Appears when the scrambling function is activated. |
| A | Appears when the companding function is activated. |
| N | Appears in narrow band mode. |
| DCS | Appears when the DCS function is activated. (When the transmission DCS is activated, it will appear only in the transmission status.) |
| AM | Appears when the AM aircraft frequency band is activated and the left or right band frequency is in the scope of aircraft frequency band. |
| 9600 | No definition for this device |

| Icon | Description |
|---|---|
| L | Appears when low transmission power is used. (No icon display for high transmission power). |
| M | No definition for this device |
| | No definition for this device |
| L | Appears when the keypad is locked. |
| SET | Appears when entering the function menu mode. |
| KEY2 | No definition for this device |

## Rear Panel




① Antenna interface

Connect N-connector external antenna to this interface.

② Data interface

Connect the TNC device to this interface via 6-pin mini DIN connector. (This function is temporally unavailable and for B model transceiver).

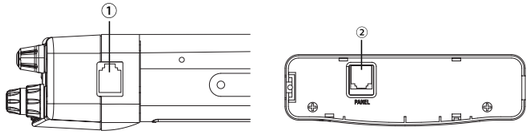
③ External speaker interface

Connect with an external speaker for better sound effect when necessary. This interface can connect with a 2-core 3.5mm audio plug. The matched load impedance is 8 ohm. When such a plug is inserted into the interface, the internal speaker will stop.

④ 13.8V DC power supply interface and fuse block

It is the DC power supply interface for supplying power to the transceiver. Use the supplied DC power cable to connect it with the DC power supply (above 12A) of the vehicle battery or the base station. Make sure the red wire is connected with the positive polarity (+) and the black wire with the negative polarity (-) of the power supply.

## Subpanel




① MIC

Connect the supplied handheld MIC to this interface.

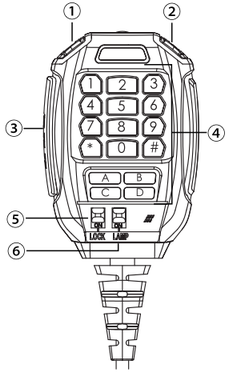
② PANEL

When this panel needs to be installed separately from the main body, use the optional extension line to connect the panel to this interface.





## Handheld MIC




① Down adjustment key ([DOWN])

Press it to make downward adjustment or decrease the main band operation frequency value, memory channel number (changing direction in scanning) or the setting value of function menu.

In most cases, this key can perform the same functions as the tuning knob of the main band.

② Up adjustment key ([UP])

Use it to make upward adjustment or increase the main band operation frequency value, memory channel number (changing direction in scanning) or the setting value of function menu.

In most cases, this key can perform the same functions as the tuning knob of the main band.

③ Transmission key (PTT)

Press this key to transmit when speaking via the handheld MIC and release it to receive.

④ Numeric keypad

In receiving status, it is used for frequency input in VFO frequency mode;

In transmission status, it is used for DTMF dialing.

⑤ Key lock switch (LOCK)

Key lock switch (all keys except PTT key)

Move the switch downwards and the "OFF" will appear. The handheld MIC is locked.

Move the switch upwards and the "ON" will appear. The handheld MIC is unlocked.

⑥ for lighting (LAMP)

Switch for turning on/off the keypad light.

Move the switch downwards and the "OFF" will appear. The keypad light is off.

Move the switch upwards and the "ON" will appear. The keypad light is on.

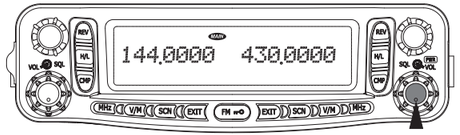
## Basic operations

### Front Panel

Turning On/Off the Transceiver

1. To turn on the transceiver, press the right band (VOL) knob for 2 seconds.

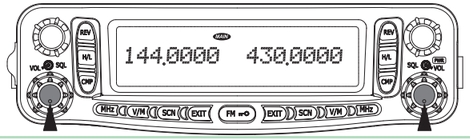
● When you turn on the transceiver, the startup information will appear on the display screen for 2 seconds and the display screen will return to the normal display of operation frequency.




2. To turn off the transceiver, once again press the right band (VOL) knob for 2 seconds.

### Volume Adjustment

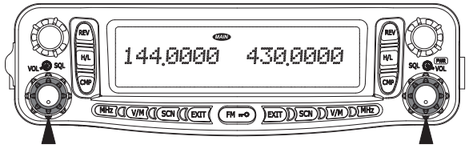
The left band and right band volume adjustments are separate from each other. The left volume knob (VOL) is for adjusting the left band volume and the right (VOL) is for adjusting the right band volume.




Clockwise turn the volume knob to increase the volume of the selected band. Counterclockwise turn it to decrease the volume.

### Squelch Level Adjustment

The left band and right band squelch adjustments are also separate from each other. The left squelch knob (SQL) is for adjusting the left band squelch level and the right (SQL) is for adjusting the right band squelch level as shown by the arrow in the figure below.




The squelch level function is used to turn off the speaker volume when there is no signal. If the squelch level is correctly set, you will hear sound only when actually receiving signals. In order to hear the sound, it is important that the higher the squelch level, the stronger the signal strength should be.

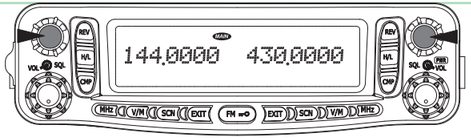
Turn the (SQL) control knob for the selected frequency band to eliminate or reduce the surrounding noise.

### Selecting a Frequency Band

In dual-receiving operation, the main band (transmissible band) is indicated by MAIN .





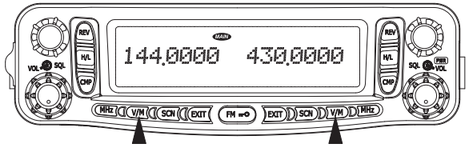



To set the main band, shortly press the left tuning knob (DIAL). The MAIN icon will appear on the left of the screen, indicating that the left band is the main band now. Shortly press the right tuning knob (DIAL) to switch the right band into the main band. With your switching the main band from left to the right, the icon MAIN will move from the left to the right as shown by the arrow in the above figure.

### Selecting an Operation Mode

Similarly, the left and the right operation modes are separate from each other. There are two operation modes available: VFO frequency mode and memory channel mode.

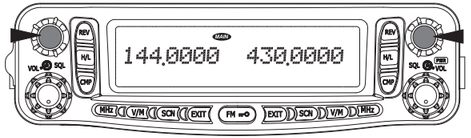
Shortly press the left or right [V/M] key to switch between the VFO frequency mode and memory channel mode for the corresponding frequency band. As shown by the arrow in the figure below.




### ■ VFO frequency mode

In VFO frequency mode, you may manually change the operation frequency.

1. Rotate the tuning knob (DIAL) to adjust the frequency of the current band in accordance with the preset frequency step. Clockwise rotation will increase the frequency and counterclockwise rotation will reduce the operation frequency.




2. You may also adjust the frequency by [UP]/[DOWN] key on the hand-held MIC or directly enter the desired frequency value on its keypad.

3. To make a large amount of frequency adjustment, you may shortly press [MHz] key to enter the MHz mode. In the MHz mode, rotate the tuning knob to make frequency adjustment at an interval of 1MHz. Shortly press the tuning knob to confirm and exit the MHz mode and adjust the frequency in regular frequency steps.

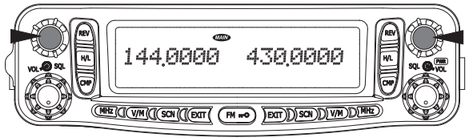
● Shortly press [EXIT] key to exit the MHz mode without saving.

**Note:**

The product offers the frequency steps of 2.5K, 5K, 6.25K, 10K, 12.5K, 25K and 50K at your choice.

## ■ Memory channel mode

The memory channel mode enables you to quickly select the commonly used frequencies and related data stored in the memory of the transceiver. Rotate the tuning knob (DIAL) to select your desired memory channel. Clockwise rotation will lead you to a higher frequency channel and counterclockwise rotation will lead you to a lower operation frequency channel.




**Note:**

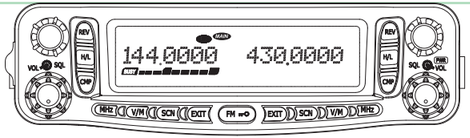
Refer to Page 24 for the details of setting up memory channel.

### Transmission

1. Select the desired frequency band and frequency/channel.
2. Press and hold the [PTT] switch on the handheld MIC while speaking to the MIC for transmission.

● The screen will display icon TX and RF power meter of the selected transmission frequency band. The RF power meter displays the relative power of the transmission output.

● Speak to the handheld MIC with normal voice and keep it 5cm from your mouth. Too near to the MIC or too loud a voice will increase the distortion of the signals received by the receiving radio and reduce their understandability.



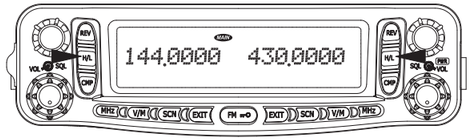

3. After the completion of speaking, release the [PTT] switch.

### Selecting the Transmission Power

Under good communication conditions, it is better to select a lower transmission power, which may reduce the risk of interference with the other frequencies at the same band. When a battery power supply is used, make sure if recharging is needed to prepare for long time use.

Shortly press [H/L] key to select high power (no display) or low (L) power.

● You may set the left and right bands to different power levels.




● You may also adjust the transmission power by context menu.

1. Shortly press the tuning knob (DIAL) to enter the context menu.
2. Rotate the tuning knob (DIAL) to select Item 11 on the context menu.

3. Shortly press the tuning knob (DIAL) to set the current context menu.
4. Rotate the tuning knob (DIAL) to select from "HIGH (high power)" or "LOW (low power )".

5. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
6. Shortly press [EXIT] to exit the context menu mode.

**Note:**

If the transceiver becomes too hot due to the high temperature in ambient environment or continuous transmission, the protection circuit may automatically start the protection function to reduce the transmission output power.

## Context Menu Mode

Many function of this transceiver are selected or set via the context menu (other than actual control knob). When you get familiar with the context menu system, you will like it for its convenience.

### Setting the Context Menu

1. Shortly press the tuning knob (DIAL) and you may set up the operation of context menu.

● The name and number of the context menu will appear on the screen.

2. Rotate the tuning knob (DIAL) to select the desired context menu.
3. Shortly press the tuning knob (DIAL) to set the current context menu.

4. Rotate the tuning knob (DIAL) to select the desired values for the selected context menu.
5. Shortly press the tuning knob (DIAL) to set the desired value.
6. Repeat Steps 2~5 to set more context menus.

● Shortly press [EXIT] to cancel the Setting the Context Menu and return to the interface of selecting the context menu.

● Once again shortly press [EXIT] to exit the context menu mode.

**Context Menu Setting Table**

| No. of context menu | Display | Description | Set value | Preset | Reference page |
|---|---|---|---|---|---|
| 01 | R-CTCSS | Setting of CTCSS for receiving | OFF: closed 67.0~254.1Hz | OFF | 27 |
| 02 | R-DCS-N | Setting of the positive code of DCS for receiving | OFF: closed D023N~D754N | OFF | 28 |
| 03 | R-DCS-I | Setting of the inverse code of DCS for receiving | OFF: closed D023I~D754I | OFF | 29 |
| 04 | R-DTMF | Setting of DTMF for receiving | OFF: closed DTMF1-8 | OFF | 31 |
| 05 | SP-SQUELCH | Squelch mode | QT: quiet talk<br>QT+DTMF: quiet talk + dual tone multiple frequency | QT | 31 |
| 06 | T-CTCSS | Setting of continuous tone coded squelch system for transmission | OFF: closed 67.0~254.1Hz | OFF | 28 |
| 07 | T-DCS-N | Setting of the positive code of digital coded system DCS for transmission | OFF: closed D023N~D754N | OFF | 29 |
| 08 | T-DCS-I | Setting of the inverse code of digital coded system DCS for transmission | OFF: closed D023I~D754I | OFF | 30 |
| 09 | T-DTMF | Setting of dual tone multiple frequency for transmission | OFF: closed DTMF1-8 | OFF | 32 |
| 10 | PTT-ID | Transmission of ID code | OFF: closed<br>BOT: press to transmit the code<br>EOT: release to transmit the code<br>BOTH: press or release to transmit the code | OFF | 33 |
| 11 | POWER | Setting of transmission power | HIGH: high power LOW: lower power | HIGH | 17 |
| 12 | W/NA | Selection of broad or narrow band | WIDE: wide band NARR: narrow band | WIDE | 35 |
| 13 | COMP | Voice companding | OFF: closed ON: open | OFF | 36 |
| 14 | SRMR | Voice encryption | OFF: closed ON: open | OFF | 36 |
| 15 | SFT | Frequency difference offset direction | OFF: closed<br>(+): positive difference<br>(-): negative difference | OFF | 21 |
| 16 | OFFSET | Offset frequency | 00.0000-90.0000MHz | 00.0000 | 22 |
| 17 | STEP | Frequency step | 2.50K, 5.00K, 6.25K, 10.00K, 12.50K, 25K, 50.00K | 5.00K | 37 |
| 18 | CH-SAVE | Channel storage | 128 signal channels on the left and right bands each | CH-001 | 24 |
| 19 | CH-DEL | Channel deletion | 128 signal channels on the left and right bands each | CH-001 | 26 |
| 20 | BEEP | Prompt tone | OFF: closed ON: open | ON | 37 |
| 21 | LED | Backlight | OFF: closed<br>LED1: red<br>LED2: blue<br>LED3: purple<br>LED4: green<br>LED5: yellow<br>LED6: light blue<br>LED7: white | LED4 | 38 |

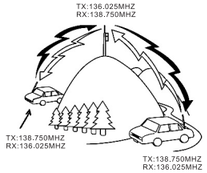
| | | | | | |
|---|---|---|---|---|---|
| 22 | BCL | Busy channel lock | OFF: closed ON: open | OFF | 38 |
| 23 | TOT | Time out time | OFF: closed 30S~600S (20 shifts) | OFF | 38 |
| 24 | TONE | Pilot carrier frequency | 1000Hz<br>1450Hz<br>1750Hz<br>2100Hz | 1000HZ | 23 |
| 25 | DTMF-TM | DTMF transmission time | 50MS<br>100MS<br>150MS<br>200MS | 100MS | 34 |
| 26 | RPT | Cross-band repeater | OFF: closed ON: open | OFF | 42 |
| 27 | AM-SW | AM aircraft band | OFF: closed ON: open | OFF | 41 |
| 28 | DTMF | DTMF group | 8 groups | ---- | 30 |
| 29 | RESET | Reset | RST-NO: do not reset RST-YES: reset | RES-NO | 40 |





## Operation via Repeater

The repeaters are generally installed and maintained by radio clubs or sometimes, in cooperation with local communication system enterprises. Compared with simplex communication, you can generally transmit over a farther distance via a repeater. Repeaters are generally installed at mountain top or other higher positions and can operate at an ERP (effective transmission power) higher than that of general radio stations. Installation in a higher position plus a high ERP can realize communication over a longer distance.




**Setting a Repeater**

Most repeaters adopt receiving/transmission frequency pairs with standard or non-standard frequency difference offset (different frequencies for transmission and receiving). Moreover, some repeaters can be utilized only when receiving audio frequency from a transceiver. For details, please consult the owner of the local repeater system.

**1. Selection of frequency difference offset direction**

The offset direction can enable your transmission frequency to be higher (+) or lower (-) than the receiving frequency.

1. Shortly press the left or right tuning knob (DIAL) to select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) and select Item 15 of the context menu as shown in the figure.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) and select from "OFF (turn-off), (+) positive offset or (-) negative offset".

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values.

According to the site of the operation frequency in the band, when the offset is valid, these icons will be displayed on the screen.

● Positive frequency offset (+)

● Negative frequency offset (-)

Or shortly press [EXIT] to return to the context menu mode without saving.

7. Shortly press [EXIT] to exit the context menu mode.

If the transmission frequency after offset exceeds the permissible scope, the transmission will be prohibited. Adopt one of the following methods to adjust the transmission frequency to be within the band restriction scope.

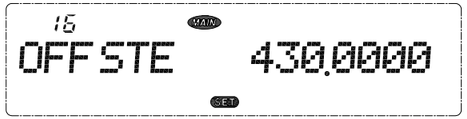
● Increase or decrease the receiving frequency within the band.

● Change the offset direction

**2. Selection of offset frequency**

The offset frequency is the transmission frequency value deviated from the receiving frequency.

1. Shortly press the left or right tuning knob (DIAL) to select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) and select Item 16 of the context menu as shown in the figure.




4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Directly enter the desired offset frequency via the keypad of handheld MIC, which will be automatically saved.

6. Shortly press the tuning knob (DIAL) to return to the context menu mode.
7. Shortly press [EXIT] to exit the context menu mode.

**Note:**

The available offset frequency values are from 00.000MHz to 90.000MHz.

**Selecting the Pilot Frequency**

This function is used to wake up the repeater in sleep status. Such repeater needs to be awaked by pilot frequency of certain intensity. Generally, when the repeater is waked up, it is not necessary to transmit the pilot frequency again.

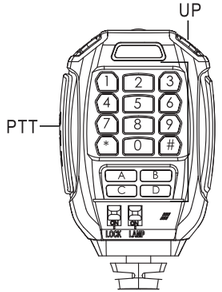
1. Shortly press the tuning knob (DIAL) to enter the context menu.
2. Rotate the tuning knob (DIAL) and select Item 24 of the context menu.

3. Shortly press the tuning knob (DIAL) to set up the current context menu.
4. Rotate the tuning knob (DIAL) and select from "1000Hz, 1450Hz, 1750Hz or 2100Hz".

5. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
6. Shortly press [EXIT] to exit the context menu mode.

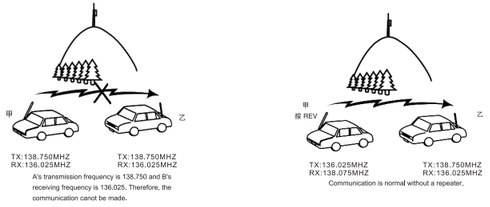
**Transmitting the Pilot Frequency**

Press the [PTT] key on the handheld MIC to transmit the pilot frequency and then press the [UP] key to send the pilot frequency.

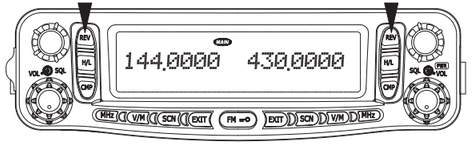



**Reverse Frequency Function**

After setting up the receiving and transmission frequencies separately, use the reverse frequency function to switch them so that you may manually inspect the strength of the signals received from other radio stations while using the repeater. If the signal of such radio station is very strong, move to the simplex frequency to continue the connection and suspend the connection with the repeater.




Shortly press [REV] to switch the frequencies.




When the reverse frequency function is activated, the symbol ìî will appear on the display screen.

## Memory Channel

In the memory channel, you may store frequently used frequencies and related data. Then, you do not need to set up every time. Instead, you may quickly call the set channel through simple operations. There are 128 memory channels on the left and right bands respectively.

### Simplex Same-Frequency Transmitting/Receiving or Different-Frequency Transmitting/Receiving?

Set any memory channel as the one for simplex same-frequency transmitting/receiving or different-frequency transmitting/receiving. Select any of the application methods for each channel as required.

The channel for simplex same-frequency transmitting/receiving allows:

- Operation of simplex frequency.

The memory channel for different-frequency transmitting/receiving allows:

- Operation of the repeater with non-standard frequency difference offset.

### Saving Simplex and Standard Transmitting/Receiving Frequencies in Memory Channel

1. Shortly press [V/M] to enter VFO mode.
2. Rotate the tuning knob (DIAL) to select the desired frequency.
   - Besides, you may press [UP]/[DOWN] on the handheld MIC to select the frequency or enter the frequency on its keypad.
3. Any other data necessary for frequency setting.
   - Audio frequency, CTCSS frequency, DCS code, etc.
4. Shortly press the tuning knob (DIAL) to enter the context menu.
5. Rotate the tuning knob (DIAL) to select Item 18 on the context menu.

6. Shortly press the tuning knob (DIAL) to set up the current context menu.
7. Rotate the tuning knob (DIAL) and select the desired memory channel number.

8. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
9. Shortly press [EXIT] to exit the context menu mode.

**Note:**

Saving receiving and transmitting frequencies that have been stored will overlap the original stored information in the memory channel.

### Saving Different-Frequency Transmitting/Receiving Frequencies in Memory Channel

Some repeaters use the transmitting/receiving frequencies with non-standard frequency difference offsets. To save these repeaters, two separate frequencies should be stored in the memory channel. Then, you may operate these repeaters without changing the offset frequencies stored in the context menu.

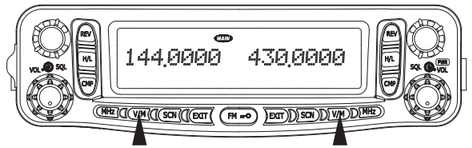
1. Shortly press [V/M] to enter VFO mode.
2. Rotate the tuning knob (DIAL) to select the desired receiving frequency.
   - Besides, you may press [UP]/[DOWN] on the handheld MIC to select the frequency.
3. Set up the transmission frequency with a difference higher than (positive offset) or lower than (negative offset) the receiving frequency.
   - Set the offset direction. (Page 21 )
   - Set the offset frequency. (Page 22)
4. Any other data necessary for frequency setting.
   - Audio frequency, CTCSS frequency, DCS code, etc.
5. Shortly press the tuning knob (DIAL) to enter the context menu.
6. Rotate the tuning knob (DIAL) to select Item 18 on the context menu.

7. Shortly press the tuning knob (DIAL) to set up the current context menu.
8. Rotate the tuning knob (DIAL) and select the desired memory channel number.

9. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
10. Shortly press [EXIT] to exit the context menu mode.

### Using the Memory Channel

1. Shortly press [V/M] to enter the mode of using memory channel.




2. Rotate the tuning knob (DIAL) to select the desired memory channel.
   - Besides, you may press [UP]/[DOWN] on the handheld MIC to select the channel.

### Clearing the Memory Channel

1. Shortly press the tuning knob (DIAL) to enter the context menu.
2. Rotate the tuning knob (DIAL) to select Item 19 on the context menu

3. Shortly press the tuning knob (DIAL) to set up the current context menu.
4. Rotate the tuning knob (DIAL) and select the desired channel number.

5. Shortly press the tuning knob (DIAL) to confirm the deletion of this channel. Or shortly press [EXIT] to return to the context menu mode without saving.
6. Shortly press [EXIT] to exit the context menu mode.

## Scanning

The “scanning” function is used for automatically monitoring the desired frequencies. Acquainting yourself with the scanning function will greatly improve your operating efficiency.
This transceiver provides the following scanning modes.
1.VFO scanning: In the VFO frequency mode, it will scan the whole frequency band with step frequency.
2.Channel scanning: In the memory channel mode, it will scan all channels stored in the memory channels.

The scanning may be made simultaneously on both the main and secondary frequency bands. Start the scanning as follows:
1.Shortly press the left or right [V/M] to select the scanning mode.
2.Shortly press the left or right [SCN] to start scanning.

When a matched signal is detected, the transceiver will stay at the busy frequency or memory channel till 8 seconds after the signal disappears and then continue to scan.
When the transceiver is in the scanning status,
1. Shortly press the tuning knob (DIAL) to stop scanning and keep the transceiver at the current frequency or memory channel.
● You may also press the [PTT] key on the handheld MIC to stop scanning and make conversation at the current frequency or memory channel.
2. Shortly press [EXIT] to exit the scanning status and return to the frequency or memory channel used before the scanning.





**Note:**
● When the CTCSS or DCS is activated, the transceiver will stay at the busy frequency and decode the CTCSS audio frequency or DCS codes. If the audio frequency or the codes are matched, the squelch will be stopped. Otherwise, the transceiver will resume the scanning.
● In scanning, you may rotate [DIAL] to change the direction of scanning frequency.
● Adjust the squelch level before using the “scanning” function. Too low a squelch level may lead to immediate stop of “scanning”.

## Continuous Tone Coded Squelch System (CTCSS)

Sometimes, you may need to hear calls from only specific persons. Continuous Tone Coded Squelch System (CTCSS) can allow you to ignore (not hear) the unwanted calls from other persons using the same frequency. To use this function, please choose the CTCSS audio frequency selected by other persons of your group. CTCSS audio frequency cannot be heard. (Refer to the CTCSS Audio frequency List in the annex.)

**Note:**
CTCSS does not guarantee your conversation privacy. It only helps you avoid irrelevant calls.

### Using CTCSS

**■ Receiving CTCSS**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 01 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) or press [UP]/[DOWN] on the handheld MIC to select OFF or the desired CTCSS frequency.

6.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Return to the context menu mode. Or shortly press [EXIT] to return to the context menu mode without saving.

7.Shortly press [EXIT] to exit the context menu mode.

**■ Transmitting CTCSS**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 06 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) or press [UP]/[DOWN] on the handheld MIC to select from “OFF or desired CTCSS frequency”.

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Return to the context menu mode. Or shortly press [EXIT] to return to the context menu mode without saving.
7. Shortly press [EXIT] to exit the context menu mode





## Digital Coded Squelch (DCS)

The Digital Coded Squelch (DCS) is another way to ignore (not to hear) the irrelative calls of other persons using the same frequency. Its function is the same as that of CTCSS. The only difference lies in the coding/decoding method and the optional code quantity. (Refer to the DCS Code List in the annex.)

### Using DCS

**■ Receiving DCS-N (DCS positive code)**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 02 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or the desired DCS code”.

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
7. Shortly press [EXIT] to exit the context menu mode.

**■ Receiving DCS-I (DCS inverse code)**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 03 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) to select from “OFF (turn off) or the desired DCS code”.

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
7. Shortly press [EXIT] to exit the context menu mode.

■ **Transmitting DCS-N (DCS positive code)**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 07 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or the desired DCS code”.

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
7. Shortly press [EXIT] to exit the context menu mode.

■ **Transmitting DCS-I (DCS inverse code)**

1. Select the desired frequency band.
2. Shortly press the tuning knob (DIAL) to enter the context menu.
3. Rotate the tuning knob (DIAL) to select Item 08 on the context menu.

4. Shortly press the tuning knob (DIAL) to set up the current context menu.
5. Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or the desired DCS code”.

6. Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
7. Shortly press [EXIT] to exit the context menu mode.





## Dual Tone Multiple Frequency (DTMF)

In addition to CTCSS and DCS which can allow you to ignore (not to hear) the irrelative calls of other persons using the same frequency, you may use DTMF system to reach the same result.

You may set up different receiving DTMF code blocks pertinent to individuals or groups so as to make selective calls.

■ **Setting the DTMF code block**

1.Shortly press the tuning knob (DIAL) to enter the context menu.
2.Rotate the tuning knob (DIAL) to select Item 28 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.
4.Rotate the tuning knob (DIAL) to select any block from “01-08”.

5.Use the keypad of the handheld MIC to enter the desired block, like “1, 2, 3, 4, 5, 6 and 7”.

● Press and hold [D] on the keypad of the handheld MIC to delete the current block number.

6.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or rotate the tuning knob (DIAL) to enter the setting for the next block without saving the current value. Or shortly press [EXIT] to return to the context menu mode without saving

7.Repeat Steps 3-6 and you may enter the desired codes for other blocks.

8.Shortly press [EXIT] to exit the context menu mode.

**Note:**

The left and right frequency bands will share only these 8 DTMF block numbers, no matter you set such number at the left or the right band.

■ **Selecting the receiving DTMF code block**

1.Shortly press the tuning knob (DIAL) to enter the context menu.
2.Rotate the tuning knob (DIAL) to select Item 04 on the context menu.

3.Shortly press the tuning knob (DIAL) to set the current context menu.
4.Rotate the tuning knob (DIAL) to select from “OFF or DTMF1, DTMF2 ------DTMF8)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

**■ Selecting squelch mode**

To use the DTMF system, you need to select QT+DTMF for the squelch mode. Only the correct QT and DTMF frequencies are received can the speaker sounds.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 05 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Rotate the tuning knob (DIAL) to select from “QT or QT+DTMF”.

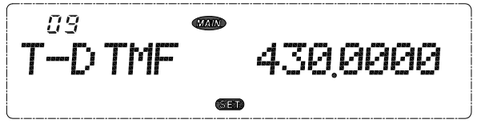
5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

**■ Selecting the transmitting DTMF code block**

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 09 on the context menu.




3.Shortly press the tuning knob (DIAL) to set the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF or DTMF1, DTMF2 ------DTMF8)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

**■ Selecting the DTMF transmission mode**

**1.Manual call**

The keys on the keypad of the handheld MIC have the same function as DTMF keys: 12 keys on the keypad phone and 4 other keys (A, B, C and D).

The manual call can transmit DTMF audio frequency in only two steps.

1.Press the [PTT] key on the handheld MIC.

2.Press the keys in the keypad zone in sequence to transmit DTMF audio frequency.

| Frequency (Hz) | 1209 | 1336 | 1447 | 1633 |
|---|---|---|---|---|
| 697 | [1] | [2] | [3] | [A] |
| 770 | [4] | [5] | [6] | [B] |
| 852 | [7] | [8] | [9] | [C] |
| 941 | [*] | [0] | [#] | [D] |

**2.Auto code transmission**

There are three ways to realize the automatic transmission of DTMF frequency block.

- Press PTT to transmit code.
- Release PTT to transmit code
- Press or release PTT to transmit code.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 10 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF, BOT (press for code transmission), EOT (release for code transmission) or BOTH (code transmission by either pressing or releasing)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

■ **Selecting the DTMF transmission time**

You may change the time for pause during the transmission of DTMF codes.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 25 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Shortly press the tuning knob (DIAL) to select from “50MS, 100MS, 150MS or 200MS”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.





## FM Radio

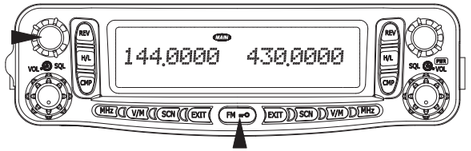
### Using FM radio

The product has built-in FM radio function. Turn on the FM radio as follows.

1.Shortly press [FM/ ] to turn on the FM radio function. Rotate the tuning knob (DIAL) to make automatic search.

● Clockwise rotation is for upward search and counterclockwise rotation for downward search.

● The FM radio will work only on the main band.




2.Once again shortly press [FM/ ]to turn off the FM radio function.

## Auxiliary Functions

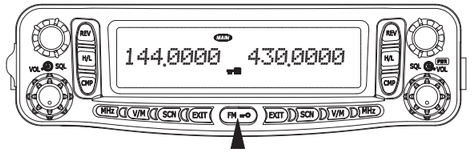
### Power-on Information

Each time you turn on the power supply of the transceiver, the related information will appear on the display screen for about 2 seconds. You may design your preferred information via frequency-writing software to replace the preset information.

### Key Locking

The key locking function will disable most keys except [VOL SQL] and [PTT] to avoid wrong activation of a certain function.

1.To enable key locking function, press [FM/ ] for 2 seconds.




2.Once again press [FM/ ] for 2 seconds to release the key locking.

### Setting Wide and Narrow Bands

Select legal communication modes according to the regulation of each country.

1.Select the desired frequency band.

2.Shortly press the tuning knob (DIAL) to enter the context menu.

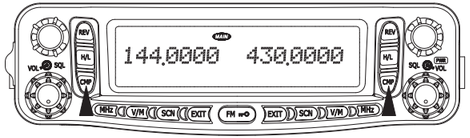
3.Rotate the tuning knob (DIAL) to select Item 12 on the context menu.

4.Shortly press the tuning knob (DIAL) to set up the current context menu.
5.Rotate the tuning knob (DIAL) to select from “WIDE (wide band) or NARR (narrow band)”.

6.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
7.Shortly press [EXIT] to exit the context menu mode.

**Setting the Voice Companding Function (for reducing noise and improving conversation clarity)**

This function can effectively reduce noise and improve conversation clarity, especially for long distance communication. You only need to press the left or right [CMP] to start the voice companding function of the corresponding frequency band. Once again shortly press this key and you will turn off the voice companding function.




You may also enable the function via context menu.
1.Shortly press the tuning knob (DIAL) to enter the context menu.
2.Rotate the tuning knob (DIAL) to select Item 13 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.
4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
6.Shortly press [EXIT] to exit the context menu mode.

**Setting the Voice Encryption function (against eavesdropping)**

This is a special voice processing mode, which can make a transceiver with the same frequency hear only scrambled voice, playing an effective role of confidentiality.
1.Shortly press the tuning knob (DIAL) to enter the context menu.
2.Rotate the tuning knob (DIAL) to select Item 14 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.
4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.
6.Shortly press [EXIT] to exit the context menu mode.

**Setting the Frequency Step**

Selecting a correct frequency step is of great importance to the selection of an accurate frequency.
1.Shortly press the tuning knob (DIAL) to enter the context menu.
2.Rotate the tuning knob (DIAL) to select Item 17 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.
4.Rotate the tuning knob (DIAL) to select from “2.50K, 5.00K, 6.25K, 10.00K, 12.50K, 25.00K or 50.00K”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

### Setting the Prompt Tone

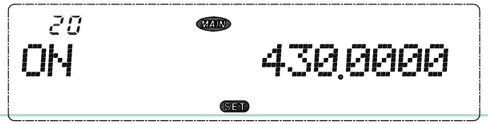
The prompt tone is a function for confirming the operation, operation error or fault status of the product. You can set to enable or disable the prompt tone function.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 20 on the context menu.

3.Shortly press the tuning knob (DIAL) to set the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.




5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

### Setting Backlight

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 21 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off), LED1 (red), LED2 (blue), LED3 (purple), LED4 (green), LED5 (yellow), LED6 (light blue) or LED7 (white)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.





### Setting Busy Channel Lock

When this function is turned on, you may not transmit on the busy channel to avoid interfering with the transceiver using the same frequency. When the current channel is busy and you press [PTT], the transceiver will give out the prompt of error and return to the receiving status.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 22 on the context menu.

3.Shortly press the tuning knob (DIAL) to set the current context menu. Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.

4.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

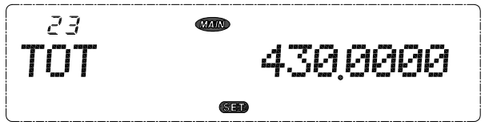
5.Shortly press [EXIT] to exit the context menu mode.

### Setting Transmission Time-out Timer (TOT)

Sometimes, it is required or necessary to restrict the time for each continuous transmission. You may utilize this function to prevent a repeater from time-out if it is connected or to save battery power.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 23 on the context menu.




3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or 30S, 60S ……600S (an interval of 30S)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

When the transmission TOT is time-out, the transceiver will give out a prompt tone and automatically return to the receiving mode. To continue the transmission, release the [PTT] key on the handheld MIC and then press it again.

### Restoring Factory Setting (RESET)

If misoperation or wrong setting has resulted in failing to use this product normally, you may use this function to restore all settings of the product to factory default settings.

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 29 on the context menu.

3.Shortly press the tuning knob (DIAL) to set up the current context menu.

4.Rotate the tuning knob (DIAL) to select from “RST-NO (do not reset) or RST-YES (reset)”

- When the RST-YES (reset) is selected, all menu items of the main and secondary frequency bands will be reset to factory default settings.
- The information in the memory channels will not be deleted after reset.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.





## Operation of AM Aircraft Frequency Band

You may turn on the AM aircraft frequency band (109-135.995MHz) of the product through simple menu operations and receive the signals transmitted from other devices.

**Setting Steps for AM Aircraft Frequency Band**

1.Shortly press the tuning knob (DIAL) to enter the context menu.

2.Rotate the tuning knob (DIAL) to select Item 27 on the context menu.

3.Shortly press the tuning knob (DIAL) to set the current context menu.

4.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.

5.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

6.Shortly press [EXIT] to exit the context menu mode.

When the AM aircraft frequency band is activated, set the frequency of the left or right band to enable it to work on the AM aircraft frequency band (109-135.995MHz) and the icon “AM” on the screen will illuminate.

Now, the left or right band will be able to receive the signals transmitted from other devices at this frequency.

## Operation of Cross-Band Repeater

This product can be set into an all-function cross-band repeater through simple menu operations. This is very useful in emergency when using a handheld device in remote areas and for cross-band communication.

Please pay attention to the following notes prior to using the cross-band repeater function:

- Consult the national laws, regulations and restrictions concerning amateur radio and make sure such operation is permitted.
- Make cautious selection of frequency pair to avoid harmful interference. Using cross-band repeater may cause potential damage to the communication environment and also seriously interfere with the operation of normal repeaters. All this may be illegal! If you do not know the repeater frequencies used locally, one safe way is to avoid using the repeater frequency sub-band but to use the frequency in the FM simplex operation band. You may also consult local frequency administrative organ for details.
- Always remember that the transmission busy/idle rate is high in repeater service, and therefore, we recommend you to use a smaller transmission power and keep the device in good ventilation.

The repeater may set up squelch (CTCSS, coding/decoding) for each selected band so as to enable your repeater to selectively receive calls. However, if the selected channel is so busy that it adopts CTCSS decoding, it may be because you have not selected a proper frequency pair and this may also cause very high potential interference to other people.

**Setting Steps for Cross-Band Repeater Operation:**

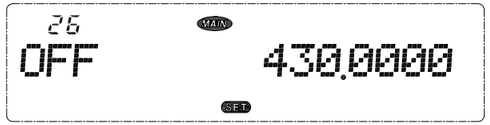
1.Prior to enabling the cross-band repeater operation, it is necessary to set the configuration of two stages and adjust the squelch to make background noise disappear.

2.Shortly press the tuning knob (DIAL) to enter the context menu.

3.Rotate the tuning knob (DIAL) to select Item 26 on the context menu.

4.Shortly press the tuning knob (DIAL) to set up the current context menu.

5.Rotate the tuning knob (DIAL) to select from “OFF (turn-off) or ON (turn-on)”.



6.Shortly press the tuning knob (DIAL) to confirm and save the desired values. Or shortly press [EXIT] to return to the context menu mode without saving.

7.Shortly press [EXIT] to exit the context menu mode.





## Maintenance

**General Information**

The product has been tuned in accordance with the specifications and passed the testing before delivery. Any attempt to repair or tune the product without the manufacturer’s authorization may lead to invalidity of the warranty.

**Repair**

When sending the product to your distributer for repair, please use the original package and submit the detailed fault description. Do not send only the component or the PCB. Please send the whole product.

**Clean-up**

For cleaning the product, please use neutral cleanser (do not use chemical of high concentration) and wet cloth.

**Troubleshooting**

The problems described in the table are troubles you may often encounter with in operation other than circuit-related faults.

## Troubleshooting

| Trouble | Possible cause | Solution |
|---|---|---|
| When it is connected with a 13.8V DC power supply and its power button is pressed, the transceiver cannot be activated and there is no display on the screen. | *1.* Reverse connection of power supply cables<br>*2.* One or several fuse(s) is (are) blown. | *1.* Correctly connect the supplied DC power cable (connect the red wire to the + terminal and the black to the – terminal).<br>*2.* Find out the cause for blown fuse, remove it and install a new fuse with the same rated value. |
| It is unable to select the frequency by rotating the tuning knob or press [UP]/[DOWN] on the handheld MIC. | The memory channel mode has been selected. | Press [V/M] to switch to the frequency mode. |
| It is unable to select the memory channel by rotating the tuning knob or press [UP]/[DOWN] on the handheld MIC. | No data have been stored in the memory channel. | Store data in some memory channels. |
| It is unable to transmit even if the [PTT] is pressed. | 1. The plug of the handheld MIC is not fully inserted into the transceiver.<br>2. You may have selected a transmission offset that makes the transmission frequency out of the permissible scope. | 1. Turn off the power and insert the plug of the handheld MIC till a click sound of the locking tab is heard.<br>2. Turn off the offset repeater function. |





## Technical Parameters

### Annex 1: CTCSS Frequency Table

| CTCSS Standard Frequency Table | | | | | |
|---|---|---|---|---|---|
| 1 | 67.0 | 23 | 141.3 | 45 | 225.7 |
| 2 | 69.3 | 24 | 146.2 | 46 | 229.1 |
| 3 | 71.9 | 25 | 151.4 | 47 | 233.6 |
| 4 | 74.4 | 26 | 156.7 | 48 | 241.8 |
| 5 | 77.0 | 27 | 159.8 | 49 | 250.3 |
| 6 | 79.7 | 28 | 162.2 | 50 | 254.1 |
| 7 | 82.5 | 29 | 165.5 | | |
| 8 | 85.4 | 30 | 167.9 | | |
| 9 | 88.5 | 31 | 171.3 | | |
| 10 | 91.5 | 32 | 173.8 | | |
| 11 | 94.8 | 33 | 177.3 | | |
| 12 | 97.4 | 34 | 179.9 | | |
| 13 | 100.0 | 35 | 183.5 | | |
| 14 | 103.5 | 36 | 186.2 | | |
| 15 | 107.2 | 37 | 189.9 | | |
| 16 | 110.9 | 38 | 192.8 | | |
| 17 | 114.8 | 39 | 196.6 | | |
| 18 | 118.8 | 40 | 199.5 | | |
| 19 | 123.0 | 41 | 203.5 | | |
| 20 | 127.3 | 42 | 206.5 | | |
| 21 | 131.8 | 43 | 210.7 | | |
| 22 | 136.5 | 44 | 218.1 | | |

### Annex 2: DCS

| DCS Standard Frequency Blocks Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | D023N | 25 | D143N | 49 | D266N | 73 | D452N | 97 | D664N |
| 2 | D025N | 26 | D145N | 50 | D271N | 74 | D454N | 98 | D703N |
| 3 | D026N | 27 | D152N | 51 | D274N | 75 | D455N | 99 | D712N |
| 4 | D031N | 28 | D155N | 52 | D306N | 76 | D462N | 100 | D723N |
| 5 | D032N | 29 | D156N | 53 | D311N | 77 | D464N | 101 | D731N |
| 6 | D036N | 30 | D162N | 54 | D315N | 78 | D465N | 102 | D732N |
| 7 | D043N | 31 | D165N | 55 | D325N | 79 | D466N | 103 | D734N |
| 8 | D047N | 32 | D172N | 56 | D331N | 80 | D503N | 104 | D743N |
| 9 | D051N | 33 | D174N | 57 | D332N | 81 | D506N | 105 | D754N |
| 10 | D053N | 34 | D205N | 58 | D343N | 82 | D516N | | |
| 11 | D054N | 35 | D212N | 59 | D346N | 83 | D523N | | |
| 12 | D065N | 36 | D223N | 60 | D351N | 84 | D526N | | |
| 13 | D071N | 37 | D225N | 61 | D356N | 85 | D532N | | |
| 14 | D072N | 38 | D226N | 62 | D364N | 86 | D546N | | |
| 15 | D073N | 39 | D243N | 63 | D365N | 87 | D565N | | |
| 16 | D074N | 40 | D244N | 64 | D371N | 88 | D606N | | |
| 17 | D114N | 41 | D245N | 65 | D411N | 89 | D612N | | |
| 18 | D115N | 42 | D246N | 66 | D412N | 90 | D624N | | |
| 19 | D116N | 43 | D251N | 67 | D413N | 91 | D627N | | |
| 20 | D122N | 44 | D252N | 68 | D423N | 92 | D631N | | |
| 21 | D125N | 45 | D255N | 69 | D431N | 93 | D632N | | |
| 22 | D131N | 46 | D261N | 70 | D432N | 94 | D645N | | |
| 23 | D132N | 47 | D263N | 71 | D445N | 95 | D654N | | |
| 24 | D134N | 48 | D265N | 72 | D446N | 96 | D662N | | |

## Specifications

The specifications are subject to changes with the technical development without notice.

| Basic Specifications | | |
|---|---|---|
| Frequency range | 136.000 – 174.000MHz(144-148MHz)<br>400.000 – 470.000MHz(430-450MHz)<br>Aircraft frequency band(Receiving)<br>AM:109.000 - 135.995MHz | |
| System | F3, F2 | |
| Antenna impedance | 50Ω | |
| Frequency stability | ±2.5ppm @ -10℃ ~ +60℃ | |
| Working environment temperature | -20℃~ +60℃ | |
| Input voltage | DC 13.8V (±15%), with the negative pole grounded | |
| Working current | Receiving<br>Transmitting | 0.5A (in squelch)<br>8.5A(VHF), 8.0A (UHF) |
| Size | 140 x 41.5 x 168mm (Width x Height x Depth) | |
| Weight | About 1 kg | |

| Transmitting part | |
|---|---|
| Output power | (VHF)40W/20W(144MHz)<br>(UHF)35W/20W(440MHz) |
| Modulation type | Variable inductance |
| Maximum offset | ± 5KHz |
| Clutter radiation | ⩽-60dB |
| MIC impedance | 2KΩ |

| Receiving part | |
|---|---|
| Intermediate frequency | 38.55MHz/450KHz (main band )<br>49.95MHz/450KHz (secondary band ) |
| Circuit type | Dual regenerative super-heterodyne type |
| Sensitivity | ⩽0.2uV (12dB SINAD) |
| Squelch sensitivity | ⩽0.16uV |
| Selectivity | 8kHz/30kHz (-6dB/-60dB) |
| Maximum audio frequency output | 2W @ 8Ω 5% distortion |

**Declaration**

This manual strives to ensure the correctness and integrity of the contents during its compilation. The company shall not be held responsible for any possible omission or error of the texts. The company reserves the right to make changes with regards to the design and specifications without notice.